Furbearer Species Richness

These EnviroAtlas national maps display the number of furbearer species based on potential habitat within each 12-digit hydrologic unit (HUC) in the conterminous United States. These data are based on habitat models rather than wildlife counts. Potential habitat may be specific to wintering, breeding, or year-round activities depending on the species.

Why are furbearer species important?

The term furbearer refers to animals that have been traditionally trapped or hunted for their fur. Furbearer species are a diverse group of mammals that include beaver, fox, raccoon, coyote, skunk, mink, and weasel. The furbearer designation varies by state depending on species populations and management.

The metric, Furbearer Species Richness, estimates the number of furbearing species that may inhabit an area, based on potential habitat. Species richness is one measure of biodiversity that represents the relative conservation value of a particular area. Many scientists believe that biodiversity, because it represents all forms of life on earth, provides or supports the core benefits that humans derive from their environment to sustain human society, economy, health, and well-being. Managing for biodiversity is one way to balance competing demands for ecosystem services.[1]

Though some furbearer species such as skunks, raccoons, beavers, and coyotes can be perceived as pests or threats, each species plays an important role within its ecosystem. Herbivorous species disperse plant seeds, which can influence the distribution and diversity of plant species. Skunks help control insect populations, and coyotes, foxes, mink, and weasels are important predators. The removal of even one species from an ecosystem can create a trophic cascade that can affect the entire food chain.

Beavers are furbearers that are influential within their ecosystems as ecosystem engineers. They are able to change the landscape and hydrology of an area through felling trees and creating dams and ponds. Beaver have been reintroduced to streams to restore natural functions to degraded stream ecosystems. Beaver ponds retain sediment and floodwater, raise local ground water tables, and create transitional wetland zones. These natural services help create habitat, restore wetlands, and protect natural ecosystem functions. Beaver can be viewed as agents of stream restoration or as a public nuisance if their work impinges on human development.[2]


Photo: Gary M. Stolz/USFWS

Fur trapping has a long tradition in the U.S. and it is considered by wildlife managers to be a necessary tool for managing furbearer populations. In addition to the market value of fur, trapping contributes to the economy through the sale of permits and equipment, representing revenue that is re-invested into wildlife management and conservation programs.

How can I use this information?

Three EnviroAtlas maps, Maximum, Mean, and Normalized Index of Biodiversity (NIB), illustrate furbearer species richness within each 12-digit HUC for the conterminous United States.[3] Used together or independently, these maps can help identify areas of potentially low or high furbearer species richness to help inform decisions about resource restoration, use, and conservation. Knowing furbearer species richness provides one aspect necessary to conserve biodiversity. Mean richness is a commonly used and understood value for comparison. NIB provides an index to compare a metric with other metrics across multiple project scales simultaneously. Maximum richness identifies habitats that are species rich but may not occupy large areas (e.g. linear riparian areas).

These maps can be used in conjunction with other maps in EnviroAtlas such as ecoregions, the U.S. Geological Survey (USGS) protected areas database (PAD-US), or the USGS Gap Analysis Project (GAP) ecological systems to identify areas with high ecological or recreational value for conservation, recreation, or restoration planning. After learning the furbearing species richness values for a particular

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12-digit HUC, users can investigate an area more intensively by using individual species models available from the GAP Project.

How were the data for this map created?

The USGS GAP project maps the distribution of natural vegetation communities and potential habitat for individual terrestrial vertebrate species. These models use environmental variables (e.g., land cover, elevation, and distance to water) to predict habitat for each species. GAP modeled habitat for furbearer species that reside, breed, or use the habitat within the conterminous U.S. for a significant portion of their life history. This map is based on a subset of GAP species identified as furbearer species.

The map was derived from 36 GAP-modeled species identified as furbearer species by state wildlife agencies combined to calculate richness by pixel. The mean and maximum numbers of Furbearer Species in each 30-meter pixel were calculated for each 12-digit HUC. The mean species richness value by HUC was divided by the maximum mean value within all HUCs to calculate the NIB.

What are the limitations of these data?

EnviroAtlas uses the best data available, but there are still limitations associated with the data. These data, based on models and large national geospatial databases, are estimations of reality that may overestimate actual furbearer species presence. Modeled data are intended to complement rather than replace monitoring data. Habitat models do not predict the actual occurrence of species, but rather their potential occurrence based on their known associations with certain habitat types. Habitat is only one factor that determines the actual presence of a species. Other factors include habitat quality, predators, prey, competing species, and fine scale habitat features.

Other essential species information in addition to species richness includes the types of species and their functional groups, whether they are rare or common, native or non-native, tolerant or intolerant of disturbance.

How can I access these data?

EnviroAtlas data can be viewed in the interactive map, accessed through web services, or downloaded. Individual 30-meter pixel data may be downloaded from the New Mexico State University Center for Applied Spatial Ecology.

Where can I get more information?

A selection of resources related to furbearer species and biodiversity is listed below. Information on the models and data used in the USGS Core Science Analytics, Synthesis & Library's GAP project is available on their website. For additional information on how the data were created, access the metadata for the data layer from the layer list drop down menu. To ask specific questions about this data layer, please contact the EnviroAtlas Team

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Selected Publications

1. Boykin, K.G., W.G. Kepner, D.F. Bradford, R.K. Guy, D.A. Kopp, A. Leimer, E. Samson, F. East, A. Neale, and K. Gergely. 2013. A national approach for mapping and quantifying habitat-based biodiversity metrics across multiple spatial scales. *Ecological Indicators* 33:139–147.

2. Butler, D.R., and G.P. Malanson. 2005. The geomorphic influences of beaver dams and failures of beaver dams. *Geomorphology* 71:48–60.

3. Kepner, W.G., K.G. Boykin, D.F. Bradford, A.C. Neale, A.K. Leimer, and K.J. Gergely. 2011. Biodiversity metrics fact sheet, EPA/600/F-11/006, U.S. Environmental Protection Agency, Washington, D.C.

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Pearce, D., and D. Moran. 1994. *The economic value of biodiversity*. International Union for Conservation of Nature, Taylor and Francis, New York, New York. 104 p.